



SRF Materials Group



EP Work-package

Update

C. Boffo

January 21, 2006

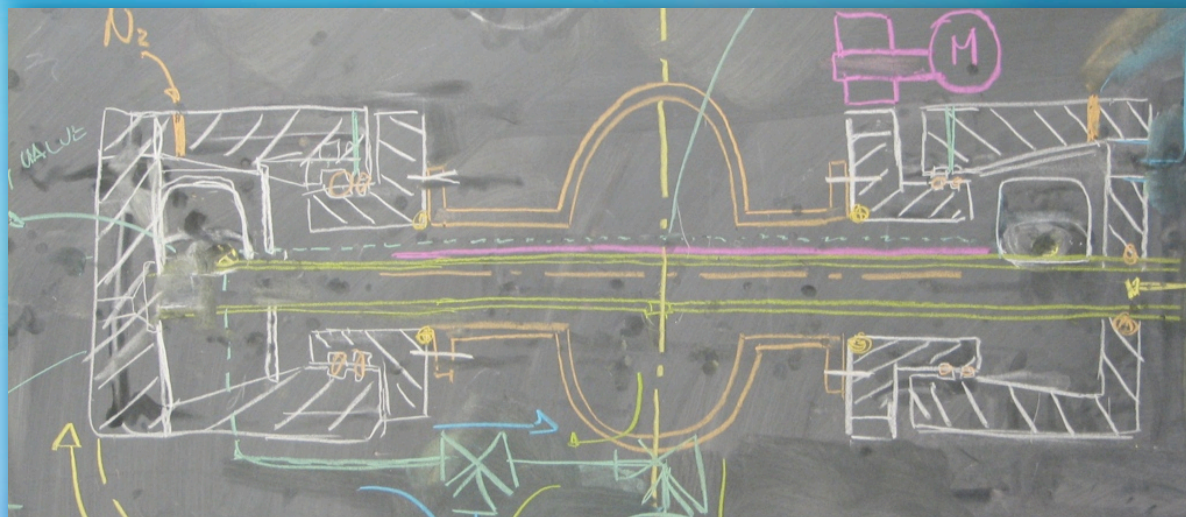


Outline

SRF Materials Group



- **EP Facility specs**
- **Pre industrial facility**
- **Collaboration w/ J-Lab**
- **EP 1-cell setup @ FNAL**
- **Involvement of industry**
- **Tumbling**
- **Newsletter and web site**



C. Boffo

January 21, 2006



EP Facility Specs



SRF Materials Group

Nb CAVITY EP SUMMARY AS OF DECEMBER 2005

Tsuyoshi Tajima* for the Working Groups at TTC and SMTF meetings

Parameter	Range	Notes
Current density	30-100 mA/cm ²	High end still has room for exploration
Voltage	8 – 16 V	Depending on the current density and HF content
Bath (solution) temperature	25 – 35 °C	
HF concentration	60 – 90 cc/L	Needs further study
Rotational speed	0<rpm<10	See Figs. A.15 and A.16
Acid flow rate	1 – 2 l/min	See Fig. A.17

In the mean time, I and Mike Kelly are working on engineering specifications of an EP facility that could fit in the ANL side of the ANL/FNAL surface treatment facility. These specs reflect the requirements stated in the document generated by Tsuyoshi, but are more focused in design details that have an impact in the fabrication of the facility itself.

C. Boffo

January 21, 2006



Pre-Industrial EP facility -1-



SRF Materials Group

- A (FNAL-ANL) working group was charged in January by Bob Kephart to define a plan for ANL/FNAL EP for ILC for the next four years, which meets the following requirements:
 - 1. In early 2010 present to DOE a credible plan for the electropolishing of 5000 or more 1.3 GHz 9-cell cavities for the ILC.
 - 2. As a part of (1) and in collaboration with appropriate vendors, establish facilities for processing 100 cavities in 2010, and 60-100 cavities in 2009 and 20-25 cavities in 2008 and up to 12 cavities in 2007.
- The document has been submitted to Bob on Feb 5 and forwarded to Hasan for approval from SMTF technical board

C. Boffo

January 21, 2006



Pre-Industrial EP facility -2-

SRF Materials Group



- Highlights on this document:
 - Specs on EP must be completed as soon as possible
 - Establish local capabilities to build expertise
 - More than one unit is necessary to reach the requested processing volume in 2009
 - Partnership with industry must be pursued right from the beginning



Collaboration w/ J-Lab



SRF Materials Group

- Established bi-weekly vid conference to discuss progress (on thursdays)
- The system @ J-Lab is being adapted to work w/ 1.3 GHz cavities
- Semi-production procedures are being defined
- 1 Cavity performance baseline before EP
- FNAL

C. Boffo

January 21, 2006



1-Cell 3.9 GHz setup @ FNAL



SRF Materials Group

- Using a 3.9 GHz setup allows us to:
 - Minimize the volume of acid to 2 liters
 - Perform the process in a hood at MDTL
 - Test the cavity at A0
 - Reduce the cavity production costs

STATUS:

M. Foley will provide up to 6 cavities as soon as the ordered material will show up

The beam tubes will be rolled in MDTL by D. Burke

C. Cooper is working with the TD ES&H group to setup a new hood in MDTL

K. Ewald is assigned 50% of his time in working on the design

We will have to undergo a safety review of the setup but should be straight forward

C. Boffo

January 21, 2006



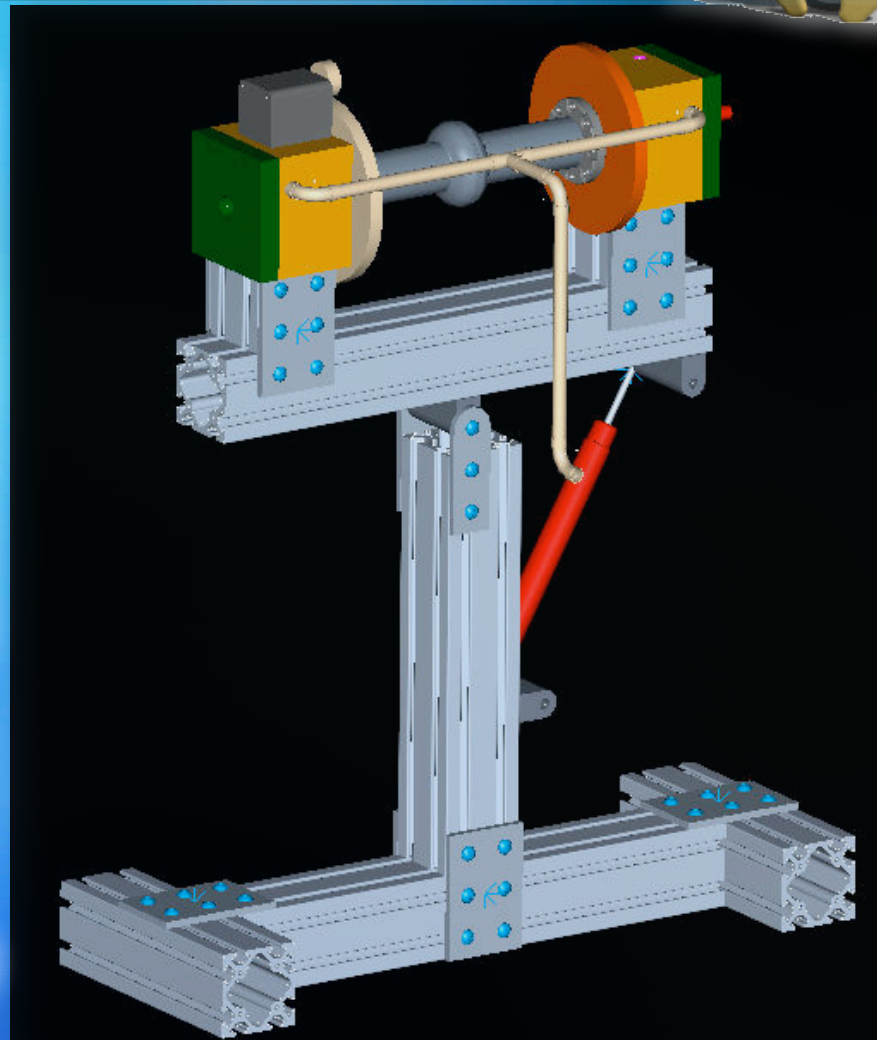
1-Cell 3.9 GHz setup @ FNAL



SRF Materials Group

- The hydraulic system has been defined
- The components of the hydraulic sys has been identified
- The air prep and control has been identified
- The support structure is defined
- The end groups are being designed
- Control system must be defined
- The motor for rotation must be identified

Estimated cost <35k\$



C. Boffo

January 21, 2006



1-Cell 3.9 GHz setup @ FNAL



SRF Materials Group

GOALS:

- Gain experience with 1 cell setup
- Create a 1-cell tight loop system at FNAL (if possible)
- Test bed for solutions for the 9-cell 1.3 GHz setup
- Test setup for R&D on the EP process in small scale

C. Boffo

January 21, 2006



Involvement of industry

SRF Materials Group



- 2 companies (SPEC and Polyflow) have been identified as possible suppliers of EP setups and will be contacted again when the plans for the new facility are more clear and the design finalized
- 1 company (Russamer Labs) claims to be able to perform EP on several materials, including Nb, without the use HF. 4 Nb samples have been sent to their lab to understand if their process is applicable to our needs

C. Boffo

January 21, 2006

10

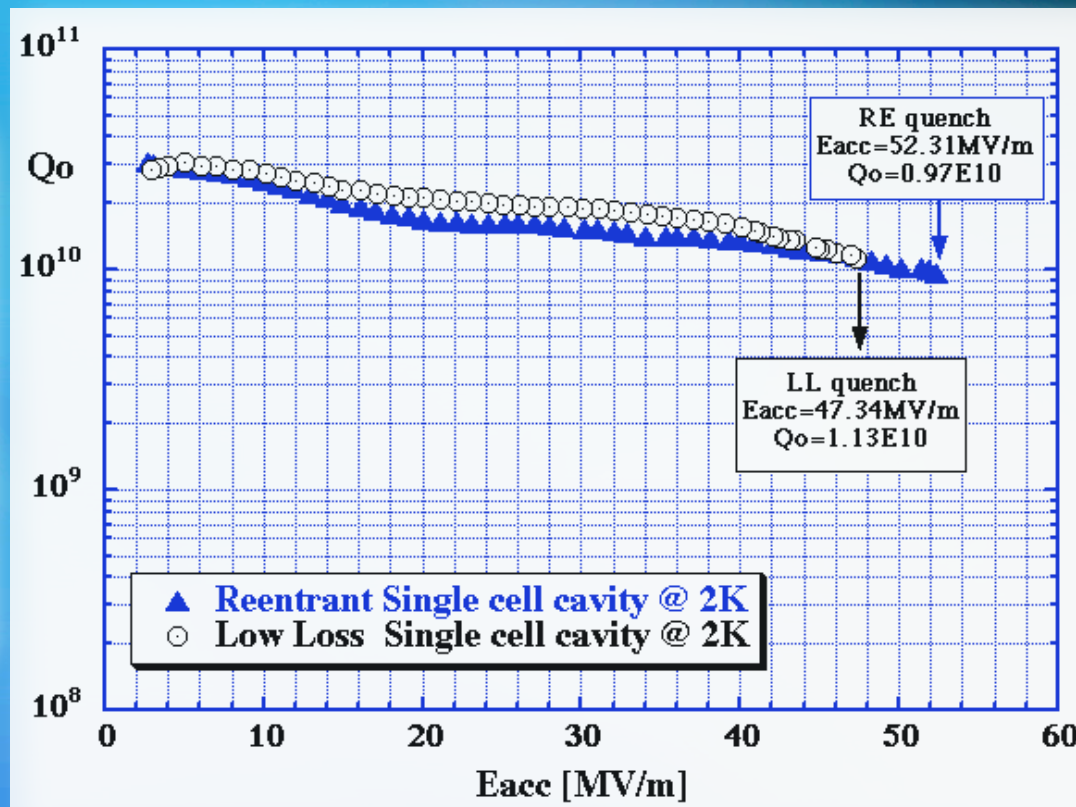


Tumbling

SRF Materials Group



- Could be a Key processing step to reach High gradients when using EP
- Environmentally friendly
- Local company interested
- Need funding



Fabrication: Cornell
Processing at KEK: Tumbling, light CP (10 μm), annealing (750 C), EP (80 μm), HPR, Bake (48 h, 120 C)



- Tsuyoshi is working on a web site containing specific info on EP and on a weekly e-letter on EP